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CLAIMS

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What is claimed is:

1. A method that relates to finding best investment portfolio plans for long-term financial plans and goals, comprising:

obtaining information on a plurality of investment categories, information on a financial

plan, and information on portfolio plans, said information on a plurality of

investment categories including data on return rates per investment period

including an expected return rate and a return rate standard deviation for each of

said investment categories and a return rate correlation coefficient for each pair

of said investment categories; said information on said financial plan including a

time horizon comprising a plurality of investment periods, at least a first

investment amount in a portfolio plan in a first investment period in said time

horizon, and at least a second investment amount put into or a first withdrawal

amount taken from said portfolio plan in a subsequent investment period of said

time horizon; and said information on portfolio plans including information useful

for defining a series of portfolio plans in which at least a first portfolio plan in a

series comprises a plurality of portfolios, each portfolio being a number of said

investment categories in particular unique allocation proportions; and

providing at least a first comparison of a series of best-diversified portfolio plans with

respect to at least a first criterion relative to the final wealth of a portfolio plan,

wherein:

each of said best-diversified portfolio plans conforms to said information on

portfolio plans and comprises a number of best-diversified portfolios, each

of said best-diversified portfolios having an expected return rate and the

smallest return rate standard deviation of any portfolio having the same

said expected return rate in a population of portfolios each comprising a

number of said investment categories;

said final wealth is the value of a portfolio plan at the end of said time horizon

using said portfolio plan for said financial plan and has a probability

distribution; and

said first criterion comprises a value for said final wealth and a probability that

said final wealth will equal or exceed said value and is determined for a

portfolio plan using simulation.

2. A method, as claimed in claim 1, wherein:

said investment period is the year.

3. A method, as claimed in claim 1, wherein:

at least one of said investment categories is an asset class.

4. A method, as claimed in claim 1, wherein:

at least one of said investment categories is a mutual fund or other investment vehicle.

5. A method, as claimed in claim 1, wherein:

said obtaining step includes displaying identifications of a number of investment

categories from which the user may choose said plurality of investment categories.

6. A method, as claimed in claim 5, wherein:

said displaying step includes displaying said data on return rates of said investment

categories.

7. A method, as claimed in claim 6, wherein:

said displaying step includes enabling revision or replacement by the user of at least one

of said identifications or said data on return rates.

8. A method, as claimed in claim 1, wherein:

said financial plan includes a desired value for final wealth of a portfolio plan at the end

of said time horizon.

9. A method, as claimed in claim 1, wherein:

said financial plan includes a plurality of investment amounts or portions of investment

amounts subject to different rules of taxation.

1   **10**. A method, as claimed in claim 1, wherein:

2   said financial plan includes said first withdrawal amount.

3   **11**. A method, as claimed in claim 1, wherein:

4   said financial plan includes data to enable calculation of amounts and time periods of

5   deductions from a portfolio plan for fees and costs and for taxes including deductions

6   based on investment returns, withdrawals from a portfolio, and portfolio value.

7   **12**. A method, as claimed in claim 1, wherein:

8   said financial plan includes at least a first inflation rate to enable calculation of inflation

9   adjustments of future values.

10   **13**. A method, as claimed in claim 1, wherein:

11   said financial plan includes information defining as a probability distribution said number

12   of said investment periods in said time horizon, said first inflation rate, or any other item

13   of said information on said financial plan.

14   **14**. A method, as claimed in claim 1, wherein:

15   any investment amount, withdrawal amount, final wealth, or other measure of financial

16   value may be expressed either before or after adjustment for any of the following: any

17   fees and costs, any taxes, any inflation.

18   **15**. A method, as claimed in claim 1, wherein:

19   said providing step includes applying concepts of Modern Portfolio Theory using said

20   data on return rates of said plurality of investment categories to obtain information

21   defining an efficient frontier curve on a graph, said curve comprising a range of portfolio

22   points each representing a number of best-diversified portfolios in said population.

23   **16**. A method, as claimed in claim 15, wherein:

24   said applying step includes applying concepts and methods known collectively as CAPM

25   including investing or borrowing at a rate commonly termed a "risk-free" rate.

26   **17**. A method, as claimed in claim 1, wherein:

1   said population of portfolios includes only portfolios having allocation proportions that

2   conform to at least a first allocation constraint defining a minimum or maximum total

3   allocation proportion for a number of said investment categories.

4   **18**. A method, as claimed in claim 1, wherein:

5   said population of portfolios includes only portfolios in which the allocation proportions of

6   said investment categories are integer multiples of an integer allocation percentage

7   increment.

8   **19**. A method, as claimed in claim 18, wherein:

9   said portfolios are grouped and characterized with respect to expected return rate

10   according to an incremental sequence of expected return rates.

11   **20**. A method, as claimed in claim 15, wherein:

12   said applying step includes displaying said efficient frontier curve on an efficient frontier

13   graph with axes representing expected return rate and return rate standard deviation.

14   **21**. A method, as claimed in claim 20, wherein:

15   said displaying step includes showing on said efficient frontier graph a number of

16   portfolio points each representing a user-specified portfolio.

17   **22**. A method, as claimed in claim 20, wherein:

18   said displaying step includes enabling user interaction with said graph including

19   choosing at least a first portfolio point and showing information for said first portfolio

20   point graphically and numerically, said information including an expected return rate, a

21   return rate standard deviation, and allocation proportions of at least a first portfolio

22   corresponding to said first portfolio point.

23   **23**. A method, as claimed in claim 22, wherein:

24   said information includes allocation proportions for each of a plurality of portfolios in said

25   population determined to best correspond to said first chosen portfolio point.

26   **24**. A method, as claimed in claim 22, wherein:

1   said information includes upper and lower limits at a specified confidence level for the

2   highest and lowest return rate in the best and worst investment periods of said time

3   horizon.

4   **25**. A method, as claimed in claim 1, wherein:

5   each of said portfolio plans comprises a plurality of component portfolio plans in which

6   separate investment amounts or separate portions of investment amounts may be

7   placed.

8   **26**. A method, as claimed in claim 25, wherein:

9   said component portfolio plans in a portfolio plan are subject to different rules of taxation.

10   **27**. A method, as claimed in claim 25, wherein:

11   said component portfolio plans in a portfolio plan comprise different portfolios.

12   **28**. A method, as claimed in claim 1, wherein:

13   at least one portfolio plan or component portfolio plan is rebalanced at the end of at least

14   a first investment period, having at the start of the next investment period the same

15   portfolio as at the start of said first investment period.

16   **29**. A method, as claimed in claim 1, wherein:

17   at least one portfolio plan or component portfolio plan is reallocated at least once during

18   said time horizon, comprising one portfolio before said reallocation and another portfolio

19   after said reallocation.

20   **30**. A method, as claimed in claim 1, wherein:

21   said series comprises portfolio plans that each have the same number of component

22   portfolio plans and are all defined according to a common system of increments and

23   limits regarding portfolios in the first investment period of said time horizon and times

24   and methods of rebalancing and reallocation of portfolios in subsequent investment

25   periods of said time horizon.

26   **31**. A method, as claimed in claim 1, wherein:

1   said first criterion is the probability that said final wealth will equal or exceed a desired

2   value for final wealth.

3   **32**. A method, as claimed in claim 1, wherein:

4   said first criterion is the highest value that said final wealth has a predetermined

5   probability of equaling or exceeding.

6   **33**. A method, as claimed in claim 1, wherein:

7   said providing step includes producing a number of simulations of said financial plan

8   using a portfolio plan for which assessment is to be performed.

9   **34**. A method, as claimed in claim 33, wherein:

10   said producing step includes determining separately for each investment period of each

11   simulation a return rate for at least a first portfolio of said portfolio plan for said

12   investment period by random selection from a probability distribution for the return rate

13   of said portfolio.

14   **35**. A method, as claimed in claim 34, wherein:

15   said probability distribution for a return rate is determined using an expected return rate

16   and a return-rate standard deviation and assuming one of a number of shapes for said

17   probability distribution.

18   **36**. A method, as claimed in claim 35, wherein:

19   said assuming step includes assuming that said shape of said probability distribution is

20   normal or lognormal.

21   **37**. A method, as claimed in claim 34, wherein:

22   said determining step includes establishing said probability distribution for the return rate

23   of at least one portfolio in at least one investment period using at least a first serial

24   correlation coefficient reflecting an effect upon said probability distribution of at least one

25   return rate in at least one previous investment period.

26   **38**. A method, as claimed in claim 34, wherein:

1   said determining step includes ascertaining for at least one investment period a return

2   rate for at least a second portfolio in said portfolio plan in said investment period by

3   random selection from a probability distribution for said return rate determined using a

4   return rate randomly selected for said first portfolio for said investment period and the

5   covariance of the return rates of said first portfolio and said second portfolio.

6   **39**. A method, as claimed in claim 33, wherein:

7   said producing step includes for each simulation determining a return rate for each

8   portfolio in a portfolio plan in each investment period of said time horizon by random

9   selection of a historical investment period using actual historical return rates of

10   investment categories for the selected historical investment period.

11   **40**. A method, as claimed in claim 33, wherein:

12   said producing step includes for each simulation using historical return rates of

13   investment categories for a series of consecutive historical investment periods equal in

14   number to the number of investment periods in said time horizon.

15   **41**. A method, as claimed in claim 33, wherein:

16   said producing step includes determining values of a number of items in said financial

17   plan by random selection from probability distributions of values of said items.

18   **42**. A method, as claimed in claim 33, wherein:

19   said producing step includes grouping final wealths produced by said simulations

20   according to a scale of value increments to develop a final wealth frequency distribution,

21   interpreting said final wealth frequency distribution as a final wealth probability

22   distribution, and using said probability distribution to determine specifications of said

23   probability distribution such as the expected final wealth or the median final wealth, the

24   probability that the final wealth will equal or exceed a value, or the largest value that the

25   final wealth has a probability of equaling or exceeding.

26   **43**. A method, as claimed in claim 33 wherein:

1   said producing step includes producing said simulations using each portfolio plan in said

2   series.

3   **44**. A method, as claimed in claim 1, wherein:

4   said providing step includes comparing in said first comparison a number of portfolio

5   plans designated by the user.

6   **45**. A method, as claimed in claim 1, wherein:

7   said providing step includes displaying for each of said series of portfolio plans a plurality

8   of the following: identifying name, symbol, or number; expected final wealth; median final

9   wealth; probability that the final wealth will equal or exceed a predetermined amount;

10   highest amount that the final wealth has a predetermined probability of equaling or

11   exceeding; an expected return rate characteristic of the portfolio plan; a return-rate

12   standard deviation characteristic of the portfolio plan; a lowest-return-rate characteristic

13   of the portfolio plan for an individual investment period relative to a predetermined

14   probability; and a lowest-return-rate characteristic of the portfolio plan for the investment

15   period in which said characteristic is lowest of all investment periods in said time horizon

16   relative to a predetermined probability.

17   **46**. A method, as claimed in claim 1, wherein:

18   said providing step includes presenting said first comparison graphically.

19   **47**. A method, as claimed in claim 46, wherein:

20   said presenting step includes displaying said first comparison in a graph with a first axis

21   representing said first criterion, a second axis representing a second measure of said

22   portfolio plan, and a portfolio plan point representing each portfolio plan in said series

23   relative to said first axis and said second axis.

24   **48**. A method, as claimed in claim 47, wherein:

25   said second measure is one of the following: identifying name, symbol, or number;

26   expected final wealth; median final wealth; probability that the final wealth will equal or

27   exceed a predetermined amount; highest amount that the final wealth has a

1   predetermined probability of equaling or exceeding; an expected return rate

2   characteristic of the portfolio plan; a return-rate standard deviation characteristic of the

3   portfolio plan; a lowest-return-rate characteristic of the portfolio plan for an individual

4   investment period relative to a predetermined probability; and a lowest-return-rate

5   characteristic of the portfolio plan for the investment period in which said characteristic is

6   lowest of all investment periods in said time horizon relative to a predetermined

7   probability.

8   **49**. A method, as claimed in claim 47, wherein:

9   said displaying step includes choosing by the user of at least a first portfolio plan point

10   represented on said graph.

11   **50**. A method, as claimed in claim 49, wherein:

12   said choosing step includes choosing by the user of a value along an axis of said graph

13   from which value said first portfolio plan point is designated.

14   **51**. A method, as claimed in claim 49, wherein:

15   said choosing step includes displaying values associated with said first portfolio plan

16   point relative to each axis of said graph.

17   **52**. A method, as claimed in claim 49, wherein:

18   said choosing step includes identifying at least a first portfolio plan designated to

19   correspond to said first portfolio plan point.

20   **53**. A method, as claimed in claim 52, wherein:

21   said identifying step includes displaying allocation proportions of at least a first portfolio

22   of said first portfolio plan.

23   **54**. A method, as claimed in claim 53, wherein:

24   said displaying step includes presenting additional information necessary to determine

25   all allocation proportions of all portfolios in said first portfolio plan in each investment

26   period of said time horizon.

27   **55**. A method, as claimed in claim 49, wherein:

1   said choosing step includes identifying each of a plurality of portfolio plans designated to

2   correspond to said first portfolio plan point.

3   **56**. A method, as claimed in claim 49, wherein:

4   said choosing step includes selecting at least a first portfolio plan corresponding to a

5   point on said graph.

6   **57**. A method, as claimed in claim 56, wherein:

7   said selecting step includes displaying a probability distribution graph showing a

8   probability distribution of the final wealth of said first portfolio plan.

9   **58**. A method, as claimed in claim 57, wherein:

10   said displaying step includes showing on said probability distribution graph a probability

11   distribution of the final wealth of a second portfolio plan.

12   **59**. A method, as claimed in claim 57, wherein:

13   said displaying step includes indicating by the user of a target value for the final wealth

14   of a portfolio plan.

15   **60**. A method, as claimed in claim 59, wherein:

16   said indicating step includes showing for each of a number of portfolio plans represented

17   on said probability distribution graph the probability that the final result will equal or

18   exceed said target value.

19   **61**. A method, as claimed in claim 56, wherein:

20   said selecting step includes displaying a simulations graph showing at least a first

21   simulation of the progression of portfolio value investment period by investment period

22   through the time horizon for said first portfolio plan.

23   **62**. A method, as claimed in claim 61, wherein:

24   said displaying step includes showing on said simulations graph a plurality of said

25   simulations.

26   **63**. A method, as claimed in claim 61, wherein:

said displaying step includes showing on said simulations graph a number of said

simulations for a second portfolio plan.

64. A method, as claimed in claim 56, wherein:

said selecting step includes displaying a sensitivity graph in which a first axis represents

a range of values for a first item of said financial plan, a second axis represents a range

of values for said first criterion, and values are represented for said first criterion of said

first portfolio plan for each of a plurality of values of said first item of said financial plan.

65. A method, as claimed in claim 64, wherein:

said first item of said financial plan is said time horizon.

66. A method, as claimed in claim 64, wherein:

said displaying step includes showing on said sensitivity graph values for said first

criterion of a second portfolio plan for each of a plurality of values of said first item of

said financial plan.

67. A method, as claimed in claim 64, wherein:

said displaying step includes showing on said sensitivity graph a plurality of curves each

representing a different value for a second item of said financial plan and showing

values of said first criterion of said first portfolio plan for each of a plurality of values of

said first item of said financial plan.

68. A method, as claimed in claim 64, wherein:

said displaying step includes choosing by the user of a value for each of a number of

items of said financial plan and displaying a corresponding value of said first criterion for

said first portfolio plan.

69. A method, as claimed in claim 1, wherein:

said obtaining step includes providing a user interface on a screen of a computer or

other electronic device for user selectable display of said information including entry

boxes in which the user may make entries or changes in said information and buttons or

1   other interaction objects by which the user may make selections pertaining to said

2   information.

3   **70.** A method, as claimed in claim 1, wherein:

4   said providing step includes providing a user interface on a screen of a computer or

5   other electronic device for user selectable display of a number of said comparisons,

6   graphs, and information on portfolio plans, including scrollbars, buttons, or other objects

7   through which the user may make selections and carry out other interactions relative to

8   said comparisons, graphs, and information.

9   **71.** An apparatus that relates to finding best investment portfolio plans for long-term financial

10 plans and goals, comprising:

11   computer memory for storing information on a plurality of investment categories,

12   information on a financial plan, and information on portfolio plans, said

13   information on a plurality of investment categories including data on return rates

14   per investment period including an expected return rate and a return rate

15   standard deviation for each of said investment categories and a return rate

16   correlation coefficient for each pair of said investment categories; said

17   information on said financial plan including a time horizon comprising a plurality

18   of investment periods, at least a first investment amount in a portfolio plan in a

19   first investment period in said time horizon, and at least a second investment

20   amount put into or a first withdrawal amount taken from said portfolio plan in a

21   subsequent investment period of said time horizon; and said information on

22   portfolio plans including information useful for defining a series of portfolio plans

23   in which at least a first portfolio plan in a series comprises a plurality of portfolios,

24   each portfolio being a number of said investment categories in particular unique

25   allocation proportions; and

1   at least a first computer processor for providing at least a first comparison of a series of

2   best-diversified portfolio plans with respect to at least a first criterion relative to

3   the final wealth of a portfolio plan, wherein:

4   each of said best-diversified portfolio plans conforms to said information on

5   portfolio plans and comprises a number of best-diversified portfolios, each

6   of said best-diversified portfolios having an expected return rate and the

7   smallest return rate standard deviation of any portfolio having the same

8   said expected return rate in a population of portfolios each comprising a

9   number of said investment categories;

10   said final wealth is the value of a portfolio plan at the end of said time horizon

11   using said portfolio plan for said financial plan and has a probability

12   distribution; and

13   said first criterion comprises a value for said final wealth and a probability that

14   said final wealth will equal or exceed said value and is determined for a

15   portfolio plan using simulation.

16   **72.** An apparatus, as claimed in claim 71, further comprising:

17   an electronic display screen for displaying at least said first comparison including display

18   of said first comparison in a graph.

19   **73.** An apparatus, as claimed in claim 71, further comprising:

20   input devices for the user to enter, select, change, and otherwise determine said

21   information and information on portfolio plans and to interact with said comparisons

22   including selection of said information and comparisons to be displayed on an electronic

23   display screen.

24   **74.** An apparatus, as claimed in claim 71, further comprising:

25   communication devices for obtaining electronically said information from other

26   computers and for sending said information and comparisons to other computers.